

# CALCULUS

- Close enough
- $\infty$ , limits
- Slope, Area  
derivative integral
- Informal vs. formal

$$\frac{d}{dx} \log_a x$$

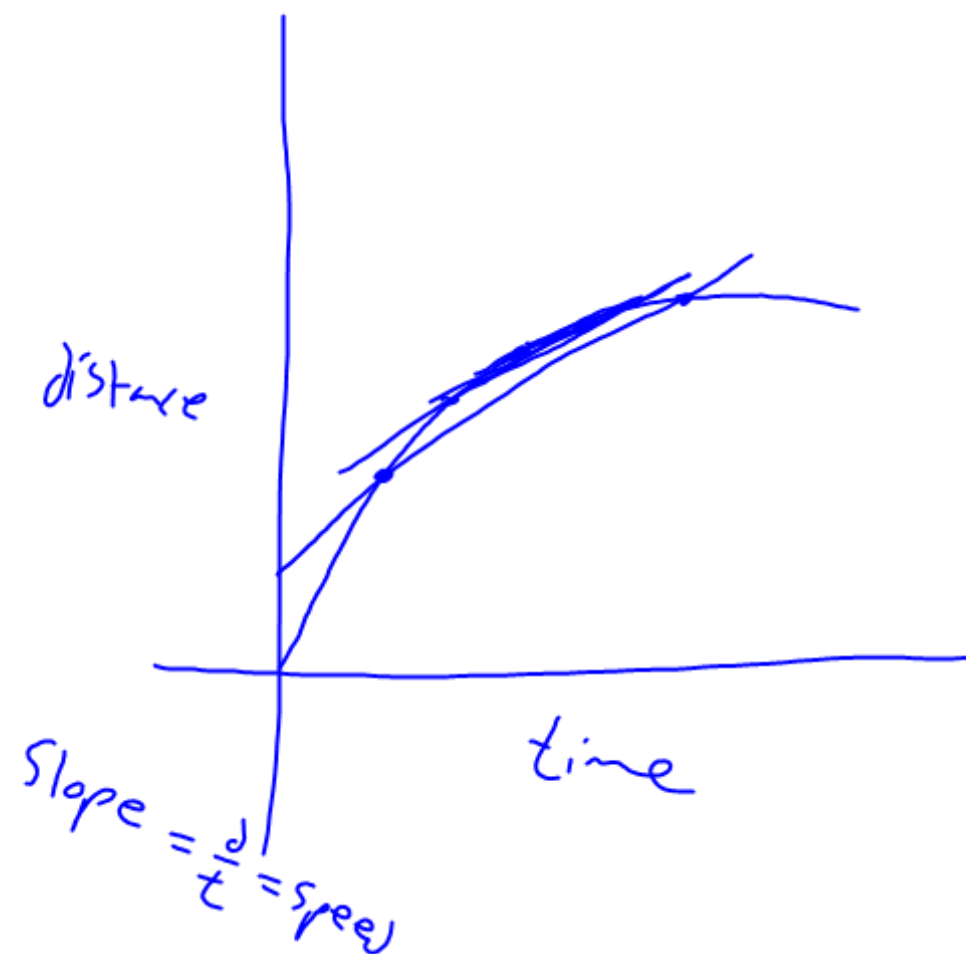
$$\int_0^{\frac{1}{2}} \frac{1}{\sqrt{1-x^2}} dx$$

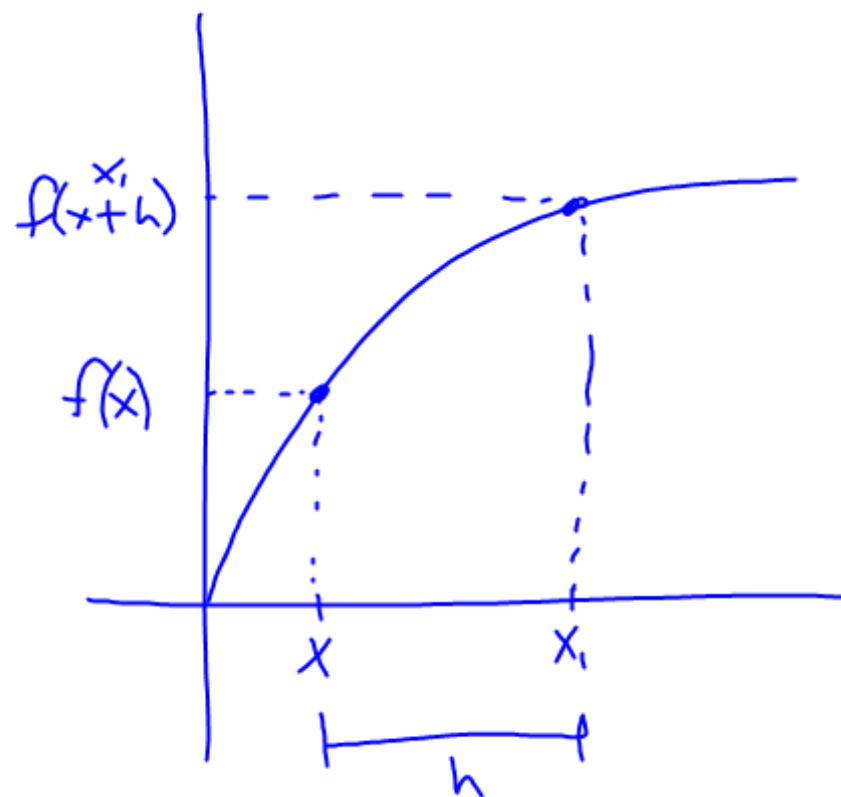
①

A rock breaks loose from the top of a cliff. What is the average speed during the first 2 seconds of fall?

(hint  $y = 16t^2$  where  $y$  = feet fallen,  $t$  = time (sec))

② What is the speed of the rock at the instant  $t = 3$  sec.?





$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

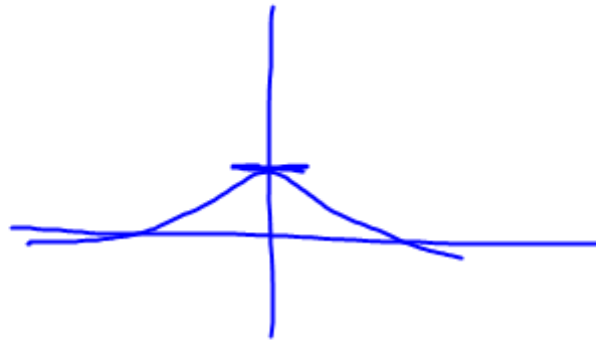
$$\text{Slope} = \frac{f(x+h) - f(x)}{h}$$

$$\text{Slope} = \frac{16(x+h)^2 - 16(x)^2}{h}$$

$$\lim_{h \rightarrow 0} 96 + 16h = 96$$

Find

$$\textcircled{1} \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

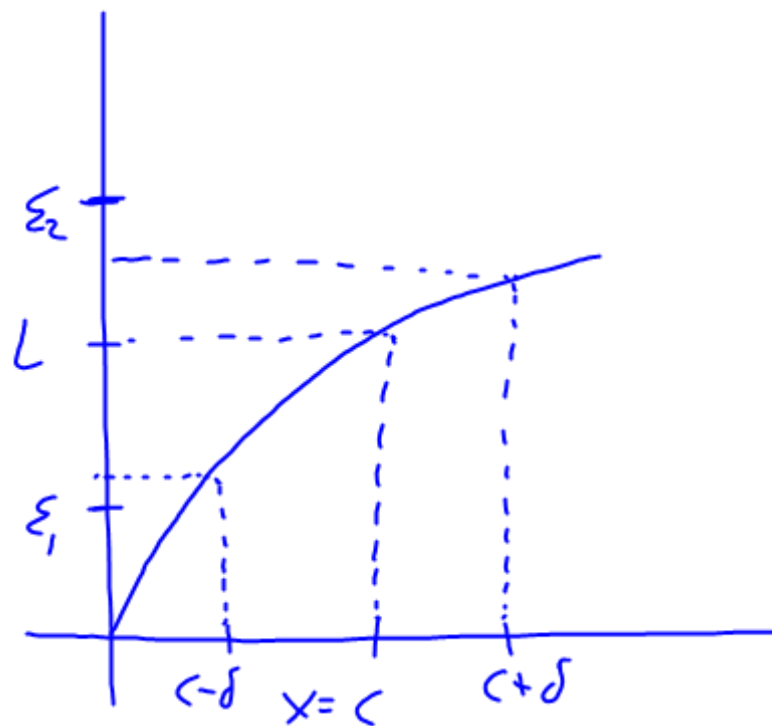


$$x=0 \quad y=$$

$$\textcircled{2} \lim_{x \rightarrow 2} \frac{x^3 - 1}{x - 2} = -7 \times 10^{10}$$

700

-∞



35-37, 39-44(1)

Read about 1 → 2 sided limits

$$\lim_{x \rightarrow 0^+} \frac{x}{|x|} = 1$$

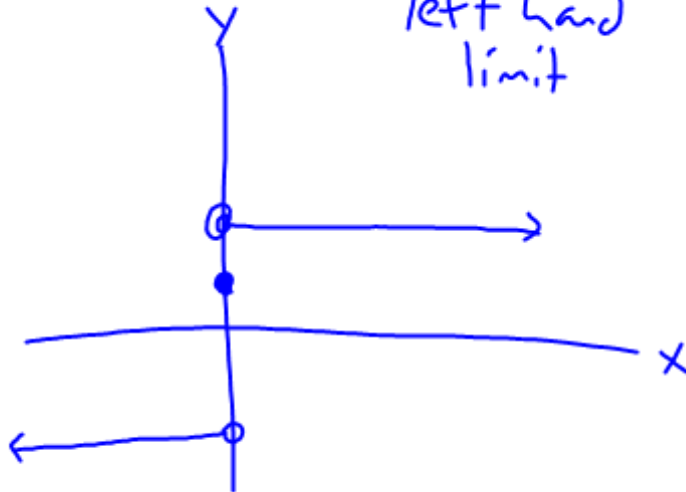
right hand  
limit

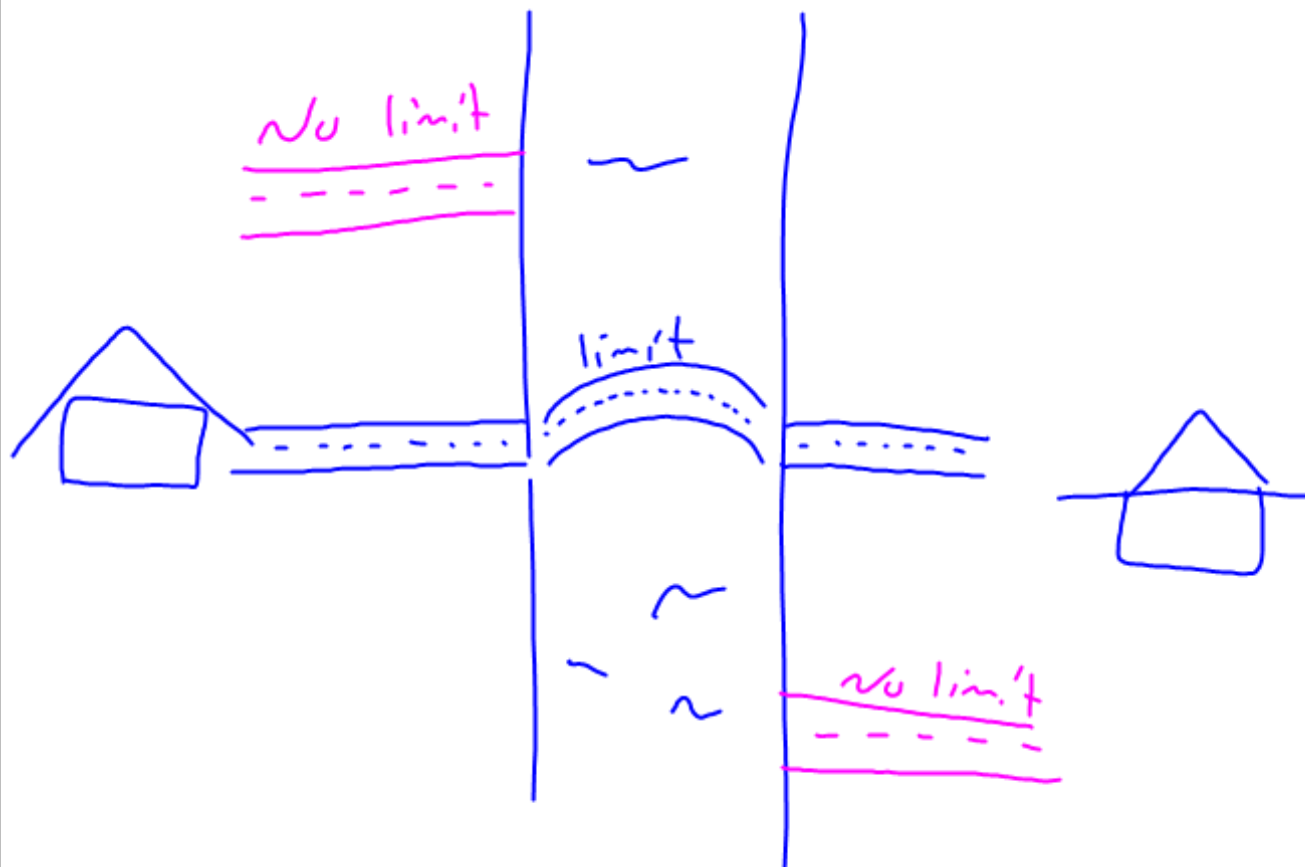
$$\lim_{x \rightarrow 0^-} \frac{x}{|x|} = -1$$

left hand  
limit

$$\lim_{x \rightarrow 0} \frac{x}{|x|} = \text{No Solution}$$

No limit





Sect. 2.1

Q.R. 5, 7

P.S. 1, 3, 5, 7, 15, 16, 19, 23-29(odd), 49

plus the 35-37, 39-44(1)